

AN INTERESTING HABITAT.

DONALD C. PEATTIE.

IT is not uncommon to see in hilly or more frequently in mountainous countries a special type of plant habitat which though of considerable botanical interest and sufficiently common and beautiful to attract general notice, has nevertheless been very little treated in scientific works.

This peculiar condition consists in a face or precipice of rock with frequently a sloping shelf below, and a continual seepage of water across the upper rock down on to the lower one. This is an essentially hydrophytic habitat, yet it is an aerial one too. Rock-loving and crevice-loving plants are at home here, and their foliage and often the long strands of their roots hang down the walls of the cliff. We are apt however to think of plants upon cliffs as xerophytes, and indeed they usually are. Lichens, certain saxifragacious plants, and such ferns as *Cheilanthes* and *Polypodium* come to mind. However, in the situations such as we have been describing, it is rather the hydrophytic or semi-hydrophytic plants which we find. For this particular combination of physical conditions of plant growth, one might propose the name Grotto, owing to the resemblance to the popularly so-called physiographic feature.

Grottoes are local though not rare, and may be found wherever there has been erosion into glens, and where there are abundant springs. The writer is familiar with them in the southern Appalachian system, and they are said to be common in the limestone mountains of Vermont and in the Laurentian Highlands. In the Middle West they are frequent in those pretty canyons cut into the limestones and sandstones of Indiana, Kentucky, Ohio and other states.

Grottoes may be seen in all stages of what we may term their conquest by plants. First of all we have merely the naked rock, or as they term it in the South, the "slick rock." By "slick" is meant a rock which is smooth, steep, and dripping with water. In the next stage the water has brought algae with it and these plants may be seen as pale green stripes upon the face of the cliff. Later mosses and liverworts lodge in the crevices, and soon they will take possession of the shelving ledge below. The Bryophytes will at length so mat the surface with their roots and break the force of the

water that the sediment gathers about them and they offer firmer hold for the higher plants. Sometimes, however, at least one species of the higher plants is the first of living things to make an appearance on the cliff. This may be a *Saxifraga* or a *Chrysosplenium*, and these rock-loving, water-loving plants are often seen with only algae to accompany them. Ferns and perennial herbs follow in due course.

A certain grotto in a mature state is well known to the writer. It is located in the Blue Ridge near the town of Melrose, North Carolina. Here in a deep mountain glen where the shade is heaviest, a spring seeps over a concave rock and supplies to the shelving ledge below, with its plant inhabitants, the continually fine drip of water which semi-aquatic plants find so favorable to their growth. It simulates, or rather it surpasses in effectiveness, the conditions in flower gardens where a continuous spray of cool water is maintained and where the soil is almost pure vegetable decay.

Here every inch of the room is contended for by every sort of plant—alga, moss, liverwort, fern, and flowering perennial. The cascade itself is tamed by the extensive root-system above to a gentle series of rivulets which run down the tangled masses of the algae. The algae in this case seem more like lianes or other aerial plants than those of ponds and pools. Such luxuriant Bryophytes as *Fegatella*, *Catherinea*, and numerous species of *Mnium*, have matted the shelf rock all over and to a remarkable depth. Most interesting of all is a marchantiaceous plant which, like the algae, hangs suspended from the upper rock and serves to conduct the rivulets of the seepage. It is a species of *Dumortiera*, and being immersed in water, unlike so many others of its tribe, it has lost the air chambers characteristic of the thallus of the *Hepaticae*. Only rudiments of these organs remain, and the thin translucent emerald-green of the long thallus makes it look more like a delicate seaweed such as *Ulva*. Seen through the clear water of a mountain stream, with the afternoon sunlight shining through it, or through the crystals of ice in winter, it is one of the most beautiful of plants.

The annual cycle of this grotto is interesting. Observed in winter, it is seen to be hung with icicles and still quite green with mosses and liverworts. There are few algae to be seen. The big basal rosettes of saxifragacious plants and the dead stalks of the summer's perennials show themselves, and the grass-green leathery thallus of

Fegatella runs over the grotto. But little else is visible save a Christmas fern strayed in by some accident and unhappy in its wet habitat.

But in March the small bright white blossoms and pinnatifid foliage of *Cardamine parviflora* L. may be seen, soon to be followed by the white *Saxifraga virginensis* Michx. The fronds of the maiden-hair fern uncoil. Then comes the handsome *Saxifraga micranthidifolia* L., growing up in a stalky and succulent way from its big reddish-green rosette of lettuce-like leaves which may at all seasons be observed in clumps all over the grotto. *Chrysosplenium americanum* Schwein. is another plant of which the small but extensive stem and foliage system may be seen throughout the moss covering. In May or in April, *Trillium grandiflorum* (Michx.) Schott. comes into its handsome flower and foliage, followed by *Trillium erectum* L. A very beautiful meadow rue, *Thalictrum clavatum* DC. comes in late spring. By summer the advent of dense shade of the trees overhead precludes the flowering of many species. In June, however, *Astilbe biternata* (Vent.) Britton and *Cimicifuga americana* Michx. raise their high stems and dainty foliage. A sterile species of *Carex* with very long basal leaves is especially noticeable in the niches of the rock.

The description of the grotto which has just been detailed is not a generality which could be applied to all grottoes. In different soils and climates the plants would differ. Even in the neighborhood of the particular grotto which has been mentioned, there are other rocks supporting such interesting elements as *Ranunculus sceleratus* L., *R. septentrionalis* Poir., *Thalictrum dioicum* L., *Mitella diphylla* L., *Stellaria pubera* Michx., *Cardamine Clematidis* Shuttlw. and often small shrubs of *Evonymus americanus* L., lodge in the crevices. In the Northern states grottoes are often a favorite hunting ground for arctic-alpine plants which extend their ranges southward along such cold wet cliffs.

HARVARD UNIVERSITY

AN EXTENDED RANGE FOR AMELANCHIER AMABILIS.—Professor K. M. Wiegand in his "Additional Notes on Amelanchier" published recently in RHODORA, xxii. 146, in speaking of the range of his *Amelanchier grandiflora* says: "Its range as far as known at present, is from central and western New York to Ontario." Last summer